A First Measurement of the Tensor-Polarized Structure Function b_1^d

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The Hermes experiment studies the spin structure of the nucleon using the 27.6 GeV longitudinally polarized positron beam of HERA and an internal target of pure gases. In addition to the well-known spin structure function of g1 measured precisely with longitudinally polarized proton and deuteron targets, the use of a tensor-polarized deuteron target provides access to the tensor-polarized structure function bid. The latter, measured with an unpolarized beam, quantifies the dependence of the nucleon momentum distributions of the nucleon spin.

At Hermes, 1.5 million DIS events were recorded with a tensor polarized deuterium target during the 2000 data taking period. Here preliminary results on the tensor-polarized structure function b_1^d are presented for the kinematical range $0.0021 < x < 0.85$ and $0.1 < Q^2 < 20$ GeV^2.